Problem Behaviors vs. the Situational Adversity Approach: HIV Risk Behaviors of Homeless Youth in Fort Lauderdale, Florida

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Abstract
Problem behavior and situational adversity theories were used to investigate HIV risks among homeless youth. Problem behavior theory posits that youth with certain personality characteristics are more likely to engage in additional risk behaviors. Situational adversity warns against exposure to the social context of homelessness. We investigated the interaction between these concepts to explain two HIV-related risk behaviors: (1) non-condom use and (2) high-risk drug use among homeless youth (n=460) in Fort Lauderdale, Florida. An index of recurring problem behaviors represented that theory and two measures of homelessness represented situational adversity. Youth with both problem behaviors and homelessness experiences were the least likely to use condoms and the most likely to use high-risk drugs compared to youth with only problem behaviors, youth with homelessness experiences only or youth with neither. One finding contradicted the situational adversity hypothesis, and in the absence of problem behaviors, duration homelessness was not related to high-risk drug use.
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Introduction

Approximately 1 in every 10 male and 1 in every 20 female teenagers will experience at least one night of homelessness in the coming year (Ringwalt, Greene, Roberston, & McPheeters, 1998). Recent interest in homeless youth has increased because, among other issues, they are highly vulnerable to the human immunodeficiency virus (HIV). One study found that young people at homeless youth clinics were eight times more likely than young people at adolescent medical clinics to have HIV (Sweeney, Lindegren, Buehler, Onorato, & Janssen, 1995). Other studies found similar infection rates (Kirby, 2003).

The federal government defines a "homeless youth" as a person between the ages of 12 and 21 who spends at least one night in a youth or adult shelter, an improvised shelter (e.g., an abandoned building, a public place, a subway or other underground location), on the streets, or in the home of a stranger (Federal Register, 1978; Greene, Ennett, & Ringwalt, 1997). Most research suggests that homeless youth engage in a large number of risk behaviors that increase the likelihood they will contract HIV (Anderson, Cheney, Clatts, Faruque, Kipke, Long, Mills, & Toomey, 1996; Rotheram-Borus, Gillis, Reid, Fernandez, & Gwadz, 1997).

This study combines a psychological and a sociological theory in the investigation of HIV risk behaviors. Problem behavior theory (Jessor & Jessor, 1977; Jessor, 1998) and situational adversity theory (Hagan & McCarthy, 1998; Whitbeck & Hoyt, 1999) provide a useful framework for the study of HIV-risk behaviors because risk behaviors can be personality-associated or social context-associated. Personality and social context interact to increase these youths' risk of HIV infection.

The problem behavior model defines risk behaviors as those that lead to compromised health and life options (Jessor 1998; Ketterlinus & Lamb, 1994). Such risk behaviors include early sexual activity, drug use, criminal and other antisocial behavior and excessive alcohol use. Youth with a syndrome of problem or risk behaviors are the focus of this research approach that argues that personality and individual perceptions of the environment largely provide the impetus for problem behaviors. Some personality characteristics of youth who have problem behaviors have been found to include tolerance of deviance, rejection of societal norms, and low expectations of success (Costa, Jessor, Fortenberry, & Donovan, 1996). Perceived environmental factors include peer models for drug use and deviant behavior (Costa, Jessor, & Turbin, 1999). A proxy measure for a risk taking personality used by problem behavior theorists is an index of several problem behaviors. Whereas the problem behavior approach does not deny the influence of social context and environment, it places explanatory emphasis on the impact of both personality and individual perception on decisions to engage in risky behavior.

The situational adversity models were developed more recently for the purpose of studying criminal behavior, mental health issues and drug use, specifically among homeless youth. The situational adversity models emphasize the influence of the social environment on risk behavior. Hagan and McCarthy (1998) found that homeless youth without institutional support from shelters and drop-in centers were more likely to engage in certain types of crime

than were homeless youth with such supports. Whitbeck and Hoyt (1999) acknowledge that homeless youth often begin their lives in poor family environments that push them from their homes. On the streets, such youth are likely faced with even worse social-environments that compound the problems they faced prior to their homelessness. Though risk behaviors may or may not have begun while at home, once homeless, young people are more vulnerable to friendships with deviant peers, and frequent sexual activity and substance use. Thus, homelessness of extended duration or recurrent frequency further amplifies other risk behaviors (Whitbeck & Hoyt, 1999). Whereas situational adversity proponents acknowledge the influence of personality on risk behaviors, they also emphasize the primacy of external causes.

This study examines the utility of the problem-behavior and situational-adversity models for the prediction of particular HIV risk behaviors -- lack of condom use and drug use -- among homeless youth. Both lack of condom use and use of drugs increase the risk of HIV infection (Centers for Disease Control and Prevention, 2003). Two predictor variables, each drawn from these theoretical models, are considered separately and in combination. These predictor variables -- problem behaviors (Brown, DiClemente, Park, 1992; Costa, et al., 1996; Costa, et al., 1999; Kipke, O'Connor, Palmer, & MacKenzie, 1995) and duration and frequency of homelessness (Anderson, Freese, & Pennbridge, 1994; Anderson, et al., 1996; Greene, et al., 1997; Hagan & McCarthy, 1998; McCarthy & Hagan, 1992a; McCarthy & Hagan, 1992b; Sondheimer, 1992; Thomson, 1997; Whitbeck & Hoyt, 1999) -- have been independently associated with HIV risk behaviors in previous research. Unlike problem behaviors, duration and frequency of homelessness have not always been associated with increased HIV risk behaviors (Bailey, Camlin, & Ennett, 1998; Johnson, Aschkenasy, Herbers, & Gillenwater, 1996; Martinez, Gleghorn, Marx, Clements, Bowman, & Katz, 1998).

Methods

The Homeless Runaway Youth Survey (HRYS) was conducted in 1994 and 1995 through a cooperative agreement between the Florida Department of Health and the Centers for Disease Control and Prevention (CDC). Four hundred and sixty youth between the ages of 12 and 20 were interviewed within two weeks of being tested for HIV. The HIV test occurred as part of the medical exams required for admission to the Covenant House shelter in Fort Lauderdale, Florida. The Fort Lauderdale site was one of seven locations studied throughout the nation by the CDC. Youth infected with the HIV virus were eligible for the survey if the reason for their visit was not evaluation or treatment for HIV disease.

Shelter clients who met any one of eight criteria were excluded from the HRYS study. Clients were excluded when they: (1) fell outside of the eligible age range (2) did not consent to HIV antibody testing, (3) returned to the clinic only for follow-up medical services, (4) received their medical entrance exams but did not complete the HRYS interview within two weeks from the initial appointment date, (5) sought HIV counseling and testing services only; (6) sought evaluation or treatment for HIV disease, (7) were previously enrolled in the survey and were returning to the shelter, or (8) visited the clinic for the sole purpose of being enrolled in HRYS.

The HRYS priority population consisted of eligible youth who attended the clinic during the survey period. A systematic sampling plan was based on the total number of eligible clients available for a six-month period. Approximately 24% (148 individuals) refused the interview. The HRYS sample complies with the federal definition of homeless youth, because the youth resided at a runaway and homeless shelter. These youth could be considered unsupervised, having been homeless for an average of three weeks and having lived at the shelter for about five days. This study refers to the entire sample as "homeless youth."

Most variables are dummy-coded with the high risk category coded one and the lower risk category coded zero (Hardy, 1993). Instances where variables are not dummy-coded are noted. Research questions involving qualitative group differences, rather than continuous interval data, commonly use dummy variables. Dummy-coding essentially turns a risk factor on or off within the multivariate equation. The first dependent variable is condom use and it concerns the last sexual intercourse. The second dependent variable, high-risk drug use, will be defined below. Demographic variables adjust for variation within the theoretical measures. The demographic variables include age, sex (56% male), sexual identity (92% heterosexual) and race/ethnicity. Age is a continuous variable ranging from 12 to 20 (59% age 18 or older). The reference category for race and ethnicity is white youth (50%). The remaining self reported race/ethnicity categories are black (27%), other race/ethnicity (14%), and Hispanic ethnicity (9%).

The theoretical variables include problem behaviors; duration and frequency of homelessness

represent the situational adversity model. Problem behaviors such as illicit criminal activity for income, violent aggressive behaviors, drug use, sexual behaviors and lack of condom use are correlated for homeless youth (Anderson, et al., 1996; Greenblatt & Robertson, 1993). Problem behaviors are summed to create a problem behavior risk index (Jessor & Jessor, 1977). In the analysis of condom use, the calculated problem behavior index includes sexual behaviors (number of partners, sexually transmitted infections, sex before age 13, and sex work participation), criminal behaviors (arrested) and drug use behaviors. In the analysis of drug use, the index excludes drug use behaviors. The risk behaviors that comprise the substance use index are defined below.

High-risk drug use is both an independent variable and a dependent variable. The four category variable includes (1) cocaine and heroin, (2) LSD, mushrooms, nitrates, amphetamines or barbiturates excluding cocaine or heroin, (3) alcohol or marijuana only and (4) none. Primary high-risk drug use includes crack cocaine. The problem behaviors index is define within the tables for condom use and for high-risk drug use.

Situational adversity is represented by two variables of the youth's homeless experiences: (1) frequency of homelessness and (2) duration of homelessness. Frequency of homelessness is defined as being homeless two or more times (compared to less frequent). Duration of homelessness is defined as youth who have been homeless for four or more weeks (compared to less).

Logistic regression was used for the condom use analysis. One table for the condom use model will be presented because frequency of homelessness was unrelated to condom use and was dropped from the analysis. Multinomial logistic regression was used for the high-risk drug use model. Two tables present the analysis for drug use because both frequency of homelessness and duration of homelessness interacted with problem behaviors.

This study uses interaction analysis to interpret the difference between two theoretical variables. Four groups are represented. The interaction group includes youth with both problem behaviors and duration or frequency homelessness. Two conditional groups include youth with problem behaviors without homelessness experiences and youth with homelessness experiences without problem behaviors (Jaccard, 2001). The interaction and conditional groups are compared to the reference group who are youth with neither risk factor. The interactional approach allows for an analysis of the specific association with the HIV risk behaviors for each theorized risk by itself and in conjunction with the other theorized risk factors. This type of interactional analysis has not been previously used to investigate HIV risk behaviors and homeless youth (Figure 1).

Results

Table 1 presents the results from the logistic regression analyses comparing the associations of extended homelessness and problem behaviors with condom use. As expected, youth with both extended homelessness and problem behaviors had used condoms the least compared to youth with only one of the theoretical risk factors (conditional group) or neither of the theoretical risk factors (reference group). When youth had both problem behaviors and had been homeless for more than three weeks, they were the least likely to use condoms compared to the reference group (OR=2.99). Among the conditional group of youth without problem behaviors, those that had been homeless four or more weeks were less likely to use condoms than youth who had been homeless for a shorter duration (OR=2.48). Likewise, among the conditional group of youth less than four weeks of being homeless, those that had problem behaviors were less likely to use condoms compared youth without problem behaviors (OR=2.19).

The theoretical significance of the findings is that condom use was least likely among youth with both risk factors, i.e., a longer duration of homelessness and problem behaviors. Youth with problem behaviors or a longer duration of homelessness were more likely than youth with both risk factors to use condoms, but just slightly. This finding suggests that risk-taking personality and the situational adversity of homelessness interact to further reduce condom use among homeless youth compared to youth with none or only one of these risk factors.

Tables 2 and 3 show the results of the multinomial logistic regression model of the interaction between the two theoretical risk factors. It was expected that youth with more homelessness experiences and problem behaviors would have the highest risk drug use compared to youth with neither of these risks or only one of the theorized risks. In a variety of ways, this expectation was supported. In Table 2, the result of the interaction between homelessness of long duration and the problem behavior index is shown. In Table 3, the interaction with frequent homelessness and the problem behavior index is presented.

Table 2 shows the interaction between the homelessness of long duration and problem behaviors. The interaction group had a higher

likelihood of high-risk drug use compared to the reference group. Youth with more time homeless and problem behaviors were more likely to use the secondary high-risk substances than alcohol and marijuana only or no substance use (column 4, OR=3.24 and column 5, OR=4.96, respectively).

The conditional variable for youth with problem behaviors (those that had been homeless less than four weeks and had two or more problem behaviors) showed that such youth were significantly more likely to use cocaine, heroin or secondary high-risk substances than no substances (column 3, OR=7.04 and column 5, OR=3.86). Interestingly, the conditional measure of the duration of homelessness was not independently associated with a substance use preference in the absence of problem behaviors.

Table 3 shows the results of the multinomial logistic regression when frequent homelessness and problem behaviors interact. As expected, five out of six interactions showed significant increases in the likelihood of using higher risk substances when problem behaviors and frequent homelessness interacted. Youth with both problem behaviors and a greater frequency of homelessness preferred cocaine or heroin to the secondary high-risk drugs (column 1, OR=5.07), to alcohol or marijuana use only (column 2, OR=3.95), and to no substance use (column 3, OR=28.91). These youth with both risk factors also preferred either the secondary high-risk substances (column 5, OR=5.70) or alcohol or marijuana only (column 5, OR=7.31) to not using any substances.

In this model (Table 3), the conditional odds ratios for both problem behaviors and frequent homelessness were independently associated with higher risk substance use. In the previous model (Table 2) the only conditional variable related to substance use was problem behaviors for youth without four or more weeks homeless. In this model, three conditional problem behavior comparisons and three conditional frequent homelessness comparisons were significantly associated with high-risk substance use. The conditional odds ratios of the problem behavior variables were most strongly associated with high-risk substance use. Youth with problem behaviors who had not been homeless before were more likely to use cocaine or heroin compared to the secondary high-risk drugs (Table 3 column 1, OR=19.00) and to no substance use (column 3, OR=12.96). Also, youth with problem behaviors that had not been homeless before were more likely to use the group of secondary high-risk substances compared to not using any substances (column 5, OR=3.28).

Three conditional frequent homelessness comparisons were associated with high-risk substance use, independent of any interaction. Youth who had been homeless more often and had less than two problem behaviors were more likely to use cocaine and heroin compared to the secondary high-risk drugs and no substance use (column 1, OR=5.23 and column 3, OR=9.12, respectively). Finally, youth who had been homeless more frequently and had less than two problem behaviors were more likely to use alcohol or marijuana than not use any substance (column 6, OR=3.28).

The association between the theoretical measures and drug use is more complicated than the association with condom use. Problem behaviors were consistently associated with the highest risk drugs independently and in conjunction with duration and frequency of homelessness. Although homelessness of greater duration and frequent homelessness are both measures of situational adversity, their associations with drug use differed. Both measures interacted with problem behaviors and were associated with an increased likelihood of using either the primary or secondary high-risk drugs when problem behaviors also occurred. However, extended homelessness, unlike frequency homelessness, was not associated with high-risk drug use in the absence of problem behaviors.

The lack of a conditional independent effect of extended homelessness on drug use in the absence of problem behaviors may help explain the inconsistent findings in the research literature. Several studies (Greene, et al., 1997; Unger, Simon, Newman, Montgomery, Kipke, & Albornoz, 1998), although not all (Johnson, et al., 1996; Martinez, et al., 1998), found that the amount of time homeless was related to drug use. None of these studies captured the interaction between problem behaviors and duration or frequency of homelessness. These sorts of independent effects analyses of the duration of homelessness do not represent the variation in drug use by individuals with different levels of involvement in problem behaviors. Thus, the findings of previous research might vary if youth with problem behaviors were over-sampled or under-sampled. Such variation may have lead to inconsistent results concerning the association between duration homeless and drug use.

Youth who returned and left home numerous times (frequency of homelessness) behaved differently from youth who had been homeless for more time (duration of homelessness). Multiple homeless episodes were independently related to high-risk drug use even when youth did not report problem behaviors. Additionally, the risk for using high-risk drugs often increased further when youth reported also having problem behaviors and a higher

frequency of homeless experiences. An unexpected finding was that the two measures of situational adversity had different conditional associations with higher risk drug use.

Discussion

This analysis raises new questions. In the absence of problem behaviors, the duration of homelessness may be measuring something different than the frequency of homelessness. Both were hypothesized as being measures of situational adversity (Hagan & McCarthy, 1998; Whitbeck & Hoyt, 1999). Possibly, lengthy experiences of homelessness may signify "true" homelessness, that is, situations in which youth have no home available to which they might return. A number of youth in the study reported being homeless many times, perhaps indicating that an opportunity exists for many youth to choose to return home. Viewed in this manner, numerous homeless experiences may simultaneously represent a problem behavior, a choice and a personality characteristic, as well as a measure of situational adversity.

The duration and frequency of homelessness were associated with different types of drug use as well. Youth who were homeless longer and had problem behaviors were more inclined to use the secondary high-risk drugs such as LSD, amphetamines and barbiturates, whereas youth who were homeless more frequently, regardless of problem behaviors, were more likely to use primary high-risk drugs like cocaine or heroin. Interestingly, youth with problem behaviors who were not homeless numerous times were also inclined to use cocaine or heroin over other drugs. Though this finding may be coincidental, it gives further support to the notion that the frequency of homelessness is a problem behavior as well as a measure of situational adversity. This finding contradicts Whitbeck and Hoyt's (1999) hypothesis that more time homeless necessarily increases risk. In the absence of problem behaviors, a greater duration of homelessness was not related to either primary or secondary high-risk drug use. Whitbeck and Hoyt's (1999) approach would have more explanatory value if it identified factors that protect youth from engaging in risk-taking behavior. As this study suggests, the absence of problem behaviors while homeless might be one such protective factor against drug use.

These findings emphasize that being homeless, regardless of problem behaviors, put youth at greater risk for HIV infection through the combination of substance use and unprotected sexual intercourse. Providing all of these youth with a safe environment will reduce their HIV risks considerably. Unfortunately, shelters usually keep youth for a couple of weeks at most and do not offer long-term residential services. Despite the brief stays, prevention and education concerning HIV and other sexually transmitted infections must be offered to all homeless youth at shelters and drop-in centers.

Whether youths ran away from or were forced to leave their homes cannot be determined with these data. However, at least one practitioner assumes that youth without problem behaviors who are homeless likely ran away from intolerable situations at home; whereas youth with multiple problem behaviors were more likely to be kicked out of their homes. Youth who have a combination of homelessness and problem behaviors are probably the most intransigent street youth (Dee Richter, Director of the Florida Network of Youth and Family Services, personal communication, November 2, 2004). Other practitioners that work with these youth may find that framework for interpreting the findings useful for targeted interventions with these youth. For example, youth without problem behaviors who run away from intolerable situations at home must be targeted with family counseling and reunification if there is no abuse or foster care. Keeping these youth from becoming homeless is crucial to reducing their risks for HIV.

Youth recently kicked out of their homes or who have multiple problem behaviors have to be addressed differently. Ideally, these youth and their families could be targeted before the youth is kicked out. No matter how bad life at home is made by the youth with problem behavior, parents should know that the homeless environment is dangerous and possibly lethal. The combination of problem behaviors and homelessness substantially elevates risk of HIV.

These findings show that street youth who have long experiences with homelessness and problem behaviors are most at risk for HIV infection. These youth are probably the least likely to accept family reunification or alternative residential treatment, unless they become involved with the criminal justice system. For all youth with problem behaviors and experiences with homelessness, it is imperative that they know they are in the highest risk categories for HIV infection. A concerted effort must be made by community-based organizations that provide HIV prevention and outreach services to reach these youth and offer HIV testing and prevention case management.

The problem behavior and situational adversity approaches used in this study were not without limitations. Proxy measures were used to represent both theories. The problem behavior index

was used without validating that personality and perception and problem behaviors were associated, as Jessor and Jessor (1977) had originally done. The situational adversity model used duration of homelessness and frequency of homeless as proxies for exposure to the social environment of homelessness. Yet, it is likely that the exposures to homelessness are not the same for all youth. Some will seek help from shelters and drop-in centers. Others may avoid these services and choose to immerse themselves within the street youth culture. Thus, the levels of risk behavior associated with exposure to homelessness may differ for different youth. This cross-sectional, convenience sample collected data at one point in time. This design scheme does not allow an examination of the development and change in behavior over time, nor can the findings be considered representative of all homeless youth in Florida. Finally, these data were collected in the mid 1990s and current drug use patterns may be different now compared to when data were collected. However, there is no reason to expect that the relationship between problem behavior and situational adversity would change.

Sadly, among HIV-infected people who were once homeless, the likelihood of becoming homeless again is high. Even when state and federal governments provide antiretroviral drugs to those in need, death from AIDS is independently associated with being homeless (Lieb, Brooks, Hopkins, Thompson, Crockett, Liberti, Jani, Nadler, Virkund, West, & McLaughlin, 2002). Given the increasing incidence of HIV among homeless youth, and the consequences of HIV both for individuals and society, it is essential to further our understanding of the personal and environmental precursors to HIV-risk-taking behavior by homeless youth.

Table 1: Logistic Regression Model for the Interaction Associations of Problem Behaviors and Duration Homeless with Lack of Condom Use

Independent Variables (coding)	b		Odds Ratios
Sex (Males=0, Females=1)	0.595	**	1.812
Age	0.166	**	1.180
Sexual Orientation	-0.717		0.488
(Hetero=0, Homo/Bi=1)			
Race/Ethnicity (White=0):			
Black (=1)	-0.253		0.777
Hispanic (=1)	0.162		1.175
Other (Caribbean, Native American,	-0.051		0.950
American, Mixed, and Other) (=1)			
Hi Problem Behaviors & Low Duration			
Homeless; compared to reference group+	0.785	*	2.193
Low Problem Behaviors & Hi Duration			
Homeless; compared to reference group+	0.909	*	2.483
Hi Problem Behaviors & Hi Duration			
Homeless; compared to reference group+	1.096	*	2.991
Constant	-4.247	**	0.014
-2 Log Likelihood	590.621		
Df	9		
N	460		

+ Hi Problem Behaviors<=3; Low Problem Behaviors>=2; Hi Duration Homeless<=4 weeks; Low Duration Homeless<=3 weeks; Reference Group=Low Problem Behaviors and Low Duration Homeless; *p<=0.05; **p<=0.01

Table 2: Multinomial Logistic Regression Model for the Interaction Associations of Problem Behaviors and Duration Homeless with High Risk Drug Use

	Column 1-Cocaine or Heroin vs. LSD, Mushrooms, Nitrates, Amphetamines or Barbiturates			Column 2-Cocaine or Heroin vs. Alcohol or Marijuana only			Column 3-Cocaine or Heroin vs. None		
Independent Variables (coding)	b		Odds Ratio	B		Odds Ratio	b		Odds Ratio
Age	0.269	*	1.309	0.043		1.044	0.095		1.100
Females=1, Males=0	-0.079		0.924	-0.700	**	0.497	-1.802	**	0.165
Homosexual/Bisexual=1, Hetero=0	0.621		1.862	0.876		2.402	2.204		9.062
Race/Ethn. Black=1, White=0	1.378		3.968	-1.509	**	0.221	-2.667	**	0.069
Race/Ethn. Hispanic=1, White=0	-0.119		0.888	-0.630		0.533	-1.008		0.365
Race/Ethn. Other =1, White=0	0.153		1.165	-0.790	*	0.454	-1.952	**	0.142
Left home >=2=1, less=0	0.262		1.299	0.358		1.431	1.393	**	4.025
Hi Problem Behaviors & Low Duration Homeless; compared to reference group+	0.602		1.825	0.614		1.847	1.952	**	7.044
Low Problem Behaviors & Hi Duration Homeless; compared to reference group+	-0.596		0.551	0.337		1.401	0.217		1.242
Hi Problem Behaviors & Hi Duration Homeless; compared to reference group+	-0.473		0.623	0.703		2.019	1.129		3.092
Constant	0.762		2.142	-0.644		0.525	1.059		2.883

Table 2: Multinomial Logistic Regression Model for the Interaction Associations of Problem Behaviors and Duration Homeless with High Risk Drug Use (Continued)

	Column 4-LSD, Mushrooms, Nitrates, Amphetamines or Barbiturates vs. Alcohol or Marijuana			Column 5-LSD, Mushrooms, Nitrates, Amphetamines or Barbiturates vs. None			Column 6-Alcohol or Marijuana vs. None		
Independent Variables (coding)	b		Odds Ratio	B		Odds Ratio	b		Odds Ratio
Age	-0.226	*	0.798	-0.174		0.840	0.052		1.053
Females=1, Males=0	-0.621		0.538	-1.722	**	0.179	-1.102	**	0.332
Homosexual/Bisexual=1, Hetero=0	0.255		1.290	1.583		4.868	1.328		3.772
Race/Ethn. Black=1, White=0	-2.887	**	0.056	-4.046	**	0.017	-1.159	**	0.314
Race/Ethn. Hispanic=1, White=0	-0.511		0.600	-0.889		0.411	-0.378		0.685
Race/Ethn. Other =1, White=0	-0.943		0.389	-2.105	**	0.122	-1.162	*	0.313
Left home >=2=1, less=0	0.096		1.101	1.131		3.098	1.034	*	2.813
Hi Problem Behaviors & Low Duration Homeless; compared to reference group+	0.012		1.012	1.351	*	3.860	1.339	**	3.814
Low Problem Behaviors & Hi Duration Homeless; compared to reference group+	0.933		2.543	0.813		2.255	-0.120		0.887
Hi Problem Behaviors & Hi Duration Homeless; compared to reference group+	1.176	*	3.241	1.602	*	4.963	0.426		1.531
Constant	-1.406	**	0.245	0.297		1.346	1.703		5.489
Model –2 Log likelihood	795.595								
Df	30								
n	460								

+ Hi Problem Behaviors=3+, Low Problem Behaviors=2 or Less; Hi Frequency Homeless=2+ Times, Low Frequency
Homeless=1 or 0; Reference Group=Low Problem Behaviors and Low Frequency Homeless;
* p<=.05; **p<=.01

Table 3: Multinomial Logistic Regression Model for the Interaction Associations of Problem Behaviors and Frequency Homeless with High Risk Drug Use

	Column 1-Cocaine or Heroin vs. LSD, Mushrooms, Nitrates, Amphetamines or Barbiturates			Column 2-Cocaine or Heroin vs. Alcohol or Marijuana only			Column 3-Cocaine or Heroin vs. None		
Independent Variables (coding)	b		Odds Ratio	B		Odds Ratio	B		Odds Ratio
Age	0.278	*	1.320	0.048		1.050	0.105		1.111
Females=1, Males=0	-0.084		0.919	-0.699	**	0.497	-1.810	**	0.164
Homosexual/Bisexual=1, Hetero=0	0.643		1.901	0.873	*	2.394	2.226	*	9.265
Race/Ethn. Black=1, White=0	1.345		3.838	-1.516	**	0.220	-2.670	**	0.069
Race/Ethn. Hispanic=1, White=0	-0.123		0.884	-0.635		0.530	-0.988		0.372
Race/Ethn. Other =1, White=0	0.154		1.167	-0.795	*	0.452	-1.960	**	0.141
Duration (Weeks) Homeless (<4=0, >=4=1)	-0.838	*	0.433	0.175		1.192	-0.270		0.763
Hi Problem Behaviors & Low Frequency Homeless; compared to reference group+	2.945	*	19.002	1.261		3.529	2.562	**	12.962
Low Problem Behaviors & Hi Frequency Homeless; compared to reference group+	1.655	*	5.234	1.023		2.781	2.210	**	9.116
Hi Problem Behaviors & Hi Frequency Homeless; compared to reference group+	1.623	*	5.067	1.375	*	3.954	3.364	**	28.905
Constant	-0.274		0.760	-1.134	*	0.322	0.604		1.830

Table 3: Multinomial Logistic Regression Model for the Interaction Associations of Problem Behaviors and Frequency Homeless with High Risk Drug Use (Continued)

	Column 4-LSD, Mushrooms, Nitrates, Amphetamines or Barbiturates vs. Alcohol or Marijuana			Column 5-LSD, Mushrooms, Nitrates, Amphetamines or Barbiturates vs. None			Column 6-Alcohol or Marijuana vs. None		
Independent Variables (coding)	b		Odds Ratio	b		Odds Ratio	B		Odds Ratio
Age	-0.229	*	0.795	-0.173		0.841	0.056		1.058
Females=1, Males=0	-0.615		0.540	-1.726	**	0.178	-1.111	**	0.329
Homosexual/Bisexual=1, Hetero=0	0.231		1.259	1.584		4.873	1.353		3.869
Race/Ethn. Black=1, White=0	-2.861	**	0.057	-4.015	**	0.018	-1.154	**	0.315
Race/Ethn. Hispanic=1, White=0	-0.512		0.599	-0.865		0.421	-0.353		0.703
Race/Ethn. Other =1, White=0	-0.949		0.387	-2.114	**	0.121	-1.165	*	0.312
Duration (Weeks) Homeless (<4=0, >=4=1)	1.013	**	2.754	0.568		1.764	-0.446		0.640
Hi Problem Behaviors & Low Frequency Homeless; compared to reference group+	-1.684		0.186	-0.383		0.682	1.187	*	3.278
Low Problem Behaviors & Hi Frequency Homeless; compared to reference group+	-0.632		0.531	0.555		1.742	1.187	*	3.278
Hi Problem Behaviors & Hi Frequency Homeless; compared to reference group+	-0.248		0.780	1.741	*	5.704	1.989	**	7.310
Constant	-0.860		0.423	0.878		2.407	1.739	**	5.690
Model –2 Log likelihood	795.595								
Df	30								
N	460								

+ Hi Problem Behaviors=3+, Low Problem Behaviors=2 or Less; Hi Frequency Homeless=2+ Times, Low Frequency
Homeless=1 or 0; Reference Group=Low Problem Behaviors and Low Frequency Homeless;
* p<=.05; **p<.01

Figure 1. Theoretical Variables of Interaction, Conditional and Reference Group

	Hi Duration or Frequency of Homeless—Yes	Hi Duration or Frequency of Homeless--No
Multiple Problem Behaviors—Yes	Interaction Group: Multiple Problem Behaviors and High Duration or Frequency of Homeless	Conditional Group: Multiple Problem Behavior without Duration or Frequency Homeless
Multiple Problem Behaviors—No	Conditional Group: High Duration or Frequency of Homeless without Multiple Problem Behaviors	Reference group: Neither Multiple Problem Behaviors nor Duration or Frequency Homeless

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